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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWN OF ACTON,

COUNTY OF HALTON

1968 - TOWN OF ACTON (County of
Halton)

1968

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Report on a water pollution
survey of the town of Acton,
county of Halton.
80347

Report

on a

Water Pollution Survey

of the

TOWN OF ACTON

County of Halton

April 1968

District Engineers Branch

Division of Sanitary Engineering

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THE ONTARIO WATER RESOURCES COMMISSION

R E P O R T

INTRODUCTION

A water pollution survey was made of the Town of Acton on July 19 and 20, 1967. The purpose of the survey was to locate and record all significant sources of pollution within the town. Such surveys are performed routinely by the Ontario Water Resources Commission as a basis for evaluating all existing and potential sources of pollution. When sources of pollution are found, corrective action is requested by the Commission. Where water and/or pollution control works appear desirable or expansions to present facilities are necessary, the Commission has a programme to aid in the construction of these works.

The information received from Mr. J. McGeachie, Town Clerk-Treasurer, is gratefully acknowledged.

I GENERAL

The Town of Acton, located at the junction of highways 7 and 25 in the north-central part of Halton County, had a 1966 assessed population of 4,353 (1967 Municipal Directory).

The topography of the north half of the town is flat to rolling with an overburden composed chiefly of sand and gravel. The southern half of the town becomes rolling to hummocky with clayey to sandy till overburden. There are some pockets of sand and gravel. Drainage for the town, which covers some 970 acres, is to

Black Creek. This stream originates above the town and upstream from Fairy Lake, flowing through Acton in an easterly direction to Silver Creek. Silver Creek is a tributary of the Credit River.

The town has an Official Plan, approved by the Minister of Municipal Affairs. The economy of the town relies on the many diversified industries located within the town.

II WATER USES

1. Municipal

The municipality obtains its water supply from two wells, the Main Street Well (No. 1) and the Churchill Road Well (No. 2). Water from Well No. 1 receives no treatment and is pumped directly to the distribution system. Water from Well No. 2 is chlorinated prior to being pumped to the distribution system or the reservoir. Well No. 2 supplied approximately 75 per cent of the water consumed in 1967. The total water pumped from each well was 27.3 million gallons (No. 1) and 79.8 million gallons (No. 2). This represents an average daily pumpage of 294,000 gallons.

2. Industrial

Beardmore and Company Limited - The water supply for the various industrial operations at the tannery is obtained from drilled wells located on the property and from Fairy Lake. An estimated total of 845,000 gpd is pumped from both sources. Approximately 200,000 gallons per month of the town's supply is

utilized for domestic purposes.

3. Recreational

Fairy Lake is used for swimming. Bacteriological examination of samples collected by the Halton County Health Unit has shown the water quality to be generally satisfactory.

III POLLUTION CONTROL

1. Domestic Waste Treatment

The town is served by a separate sewer system. Domestic sewage is treated at a mechanically aerated activated sludge plant with a design capacity of 250,000 gpd. The treatment consists of comminution, primary sedimentation, mechanical aeration and chlorination. The final effluent is discharged to Black Creek.

An extension to the plant is proposed which will increase the plant capacity to a total of 625,000 gpd. Tertiary treatment will be provided by using a settling pond and sand and gravel filters.

2. Industrial Waste Treatment

(a) Beardmore and Company Limited - Beardmore and Company Limited operates a tannery where cattle hides are processed into soles and upper leather for shoes, and also specialty leathers for a wide variety of consumer products. In the 1965 OWRC industrial waste survey of the plant, it was reported that approximately 7,500 lb of BOD, 10,000 lb of suspended solids, 20,000 lb of sodium chloride, 6,400 lb of total hardness as calcium carbonate and 900 lb

of iodine demand (reducing agents) were being discharged daily from the tannery. Industrial wastes are directed to two different treatment systems.

Industrial and sanitary wastes from the main collection sump are pumped to two primary sedimentation lagoons in series and then to a large secondary storage lagoon. In the spring, summer and fall months, the effluent is pumped through a network of spray systems onto surrounding fields. No spraying is carried out in the winter, and in early spring the lagoon system is drained to Black Creek. Approximately 403,000 gallons per day is discharged to this system.

Wastes from the black-liquor sump are pumped to storage lagoons. The black liquor can be applied to ridge-and-furrow ploughed land all year round. About 72,400 gallons per day are directed to the lagoons.

Other plant flows (92,000 gpd) such as boiler blowdown, backwash water, cooling water from presses and compressors and water from drinking fountains are discharged to Black Creek.

Sanitary wastes (2,000 gpd) from certain washrooms in the plant are directed to the Acton municipal sanitary sewer system.

A detailed description of the plant operations at Beardmore is available in the 1965 OWRC industrial waste survey report.

(b) H.K. Porter Company Limited - This company is engaged in the manufacture of circular saws, saw blades, clutch facings, brake linings and refractories used for surface lining in furnaces, combustion chambers and pouring equipment.

Domestic and industrial wastes are discharged to the municipal sanitary sewer. Cooling water from the grinding machines is discharged to a tributary of Fairy Lake. Approximately 20,000 gpd of the town's water supply is consumed for industrial purposes and 2,500 gpd for domestic purposes.

(c) Miscellaneous - Domestic and industrial wastes from the following industries are discharged to the Acton municipal sewer system: Building Products of Canada Limited (Pipe and Micro Plastics Division); Force Electric Products; Superior Glove Works; Mason Knitting Company Limited; Acton Creamery; and Acton Jersey Dairy.

IV PRESENTATION OF SAMPLE RESULTS

The laboratory results of the bacteriological examinations and chemical analyses of samples collected from the watercourses and outfalls are contained in the tables appended to this report. A description of the significance of the laboratory tests and a summary of water-quality objectives are also included.

The results were generally satisfactory and within the Commission's objectives for surface waters and for effluent discharges. Only three samples showed bacterial contamination. Two of these were collected from tributary "A" of Black Creek at Elmore

Drive and at Elizabeth Drive. A possible origin of the contamination is drainage from farmlands upstream.

A bacteriological sample collected during a rainfall from Black Creek at Brock Street showed a high coliform count above the Commission's objective. A sample, collected the following day, during dry weather, had a coliform count within the acceptable limit.

Results of the OWRC water quality monitoring programme of Black Creek have indicated that, of the 13 samples collected in 1967 at the Third Line downstream from the Acton water pollution control plant, 62 per cent showed the water quality to be adversely affected. The BOD and coliform counts were above the Commission objectives for surface waters.

V DISCUSSION

The average flow to the existing municipal water pollution control plant exceeds the present plant design flow by approximately 30 per cent. Excessive surface drainage entering the sewer system contributes to this hydraulic overloading. During high-flow periods, aeration tank solids are sometimes washed out.

Problems have occurred with the sludge heat exchanger as it is unable to maintain a satisfactory temperature in the digester sludge. Also, the chlorinator has malfunctioned numerous times because of an inadequate water supply. Water is pumped from

Black Creek for operational purposes of the chlorinator and for domestic purposes such as washing and toilet facilities.

It is anticipated that with the 375,000 gpd extension to the plant that many of the operating difficulties now being experienced will be alleviated. An adequate water supply for domestic and operational purposes will be obtained from the municipal system.

With the provision of tertiary treatment at the plant, it is also expected that the water quality of Black Creek downstream will be improved.

VI REFUSE DISPOSAL

The municipal refuse disposal site is located within the town limits, south of Churchill Road and east of the access road to the Acton Water Pollution Control Plant. A burn-and-cover type of operation is employed and no water pollution problems are expected as a result.

VII SUMMARY AND CONCLUSIONS

A water pollution survey was conducted in the Town of Acton in July, 1967.

Domestic water for the town supplied by the municipal water works.

The town is served by a separate sewer system. Sanitary wastes are directed to a 250,000 gpd mechanically aerated activated sludge plant with the final effluent discharging to Black Creek.

The present plant is hydraulically overloaded and operational difficulties have been experienced as a result. A 375,000 gpd extension to the plant is proposed and will include tertiary treatment. With the strict enforcement of the town's sewer by-law prohibiting the connections of roof, house, and street drains to the sanitary sewer, the hydraulic overloading of the plant would be kept to a minimum.

Bacteriological and chemical analyses of samples collected from outfalls and watercourses within the town have shown that the quality of the surface water and effluent discharges to be generally satisfactory. However, the OWRC monitoring programme has shown that the water quality of Black Creek downstream from the Acton water pollution control plant has deteriorated. It is anticipated that with the installation of tertiary treatment at the plant, the water quality will improve. The town should continue its efforts to abate water pollution.

VIII RECOMMENDATIONS

1. The Town of Acton should continue its efforts to abate water pollution.

2. The sewer by-law prohibiting the connections of roof, house, and street drains to the sanitary sewer should be strictly enforced.

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APPENDIX

WATER QUALITY AND EFFLUENT OBJECTIVES

The OWRC objectives for surface waters in Ontario are as follows:

5-Day BOD - not greater than 4 ppm
Total Coliform Count - not greater than
2,400 coliforms per 100 ml
Phenolic Equivalents - Average - not greater than 2 ppb
- Maximum - not greater than 5 ppb
pH Range - 6.7 to 8.5

A few pertinent maximum limits of contaminants in sewage treatment plant and industrial effluents are listed below. Adequate protection for surface waters except in certain specific instances influenced by local conditions, should be provided if the following concentrations and pH range are not exceeded.

5-Day BOD - not greater than 15 ppm
Suspended Solids - not greater than 15 ppm
Phenols - not greater than 20 ppb
pH - 5.5 to 10.6
Iron - not greater than 17 ppm
Ether Solubles (Oil) - not greater than 15 ppm

GLOSSARY OF TERMS

Bacteriological Examinations - The Membrane Filter Technique is used by the OWRC to obtain a direct count of coliform organisms. These organisms are the normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in untreated sewage and are, in general, relatively few in number in other stream pollutants.

Biochemical Oxygen Demand (BOD) - The biochemical oxygen demand test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in sewage, sewage effluent polluted waters, or industrial wastes, by aerobic biochemical action.

Solids - The analyses for solids include tests for total suspended and dissolved solids. The total solids is a measure of the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature whereas the dissolved solids are a measure of those solids in solution.

Oils and Ether Soluble Materials - These include oils and all other soluble materials such as tarry substances and greases. The presence of these pollutants renders water difficult and sometimes impractical to treat either for industrial or domestic use. Oils make streams unsightly and water unfit for bathing.

Phenolic Compounds - Phenols react with chlorine to produce intensely aromatic compounds. These compounds, even when highly diluted, may give a taste and odour to the water which is variously described as medicinal, chemical or iodoform. Phenols taint fish and are toxic to fish, depending on the concentration. Normal water contains no phenolic compounds.

Alkyl Benzene Sulfonate (ABS) - The alkyl benzene sulfonate portion of the anionic detergents is reported in ppm. The test is generally employed to indicate the presence of domestic wastewater. The popular use of synthetic detergents for general cleaning purposes has

resulted in the incidence of residual ABS in streams. As an objective, the ABS concentration should not exceed 0.5 ppm in water used for domestic purposes.

Chlorides - Chlorides in reasonable concentrations are not harmful to humans. At concentrations above 250 ppm they give a salty taste to the water which is objectionable to many people. For this reason, the OWRC Drinking Water Objectives recommends that chlorides be limited to 250 ppm in supplies intended for public use.

pH - The pH value, for practical purposes, refers to acidity or alkalinity, and is a measure of intensity rather than quantity. The pH scale extends from zero (very acidic) to 14 (very alkaline), with the middle value of 7 corresponding to neutrality at 25^oCentigrade. The pH of surface water should be in the range of 6.7 to 8.5.

TOWN OF ACTON

CREDIT RIVER TRIBUTARIES AND OUTFALLS

TABLE I

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS		DISS. (PPM)	ANIONIC DETERGENTS		PHENOLS IN PPB	ETHER SOLUBLES	M.F. COLIFORM COUNT PER 100 ML
				TOTAL (PPM)	SUSP. (PPM)		AS	ABS			
CSBTA - 33.0	BLACK CREEK (FAIRY LAKE) TRIBUTARY "A" AT ELMORE DRIVE.	JULY 19/67	0.7	452	6	446	0.0	-	-	-	4,000
CSBTA - 33.9	BLACK CREEK (FAIRY LAKE) TRIBUTARY "A" AT ELIZABETH DRIVE.	JULY 19/67	2.2	838	446	392	0.0	-	-	-	4,500
CSB - 33.9 R	12-INCH Ø RELIEF SEWER ELIZABETH DRIVE SEWAGE PUMP- ING STATION.	JULY 19/67	NO FLOW NOTED								
CSB - 33.9 W	15-INCH Ø STORM SEWER ELIZABETH DRIVE & JEFFREY AVENUE.	JULY 19/67	NO FLOW NOTED								
CSBTC - 34.7 W	24-INCH Ø STORM SEWER - ACTON BLVD.	JULY 19/67	NO FLOW NOTED								
CSBTC - 34.4 W	12-INCH Ø STORM SEWER - WALLACE ST.	JULY 19/67	NO FLOW NOTED								
CSBTC - 34.4 W=2	12-INCH Ø STORM SEWER - WALLACE ST.	JULY 19/67	NO FLOW NOTED								
CSBTC - 34.4	BLACK CREEK TRIBU- TARY "C" DOWNSTREAM FROM WALLACE STREET.	JULY 19/67	0.7	574	8	566	0.0	-	-	-	420

TABLE I (CONTD)

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS			ANIONIC DETERGENTS		PHENOLS IN PPB	ETHER SOLUBLES	M.F. COLIFORM	
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)	AS	ABS			COUNT 100	PER ML
CSB - 34.5	BLACK CREEK UP- STREAM FROM H.K. PORTER CO. LTD.	JULY 19/68	3.2	450	9	441	0.0	-	-	-	320	
CSB - 34.5 1	H.K. PORTER CO. LTD.- INDUSTRIAL WASTE EFFLUENT.	JULY 19/68	1.2	SAMPLE EXHAUSTED					3	0	40	
CSB - 34.3 W	12-INCH Ø STORM SEWER SOUTH OF CNR TRACKS.	JULY 19/68	NO FLOW NOTED									
CSB - 34.1 W	8-INCH Ø STORM SEWER-WILLOW ST.	JULY 19/67	NO FLOW NOTED									
CSB - 34.01	BLACK CREEK - MAIN STREET (N.W. END OF ACTON.	JULY 19/67	0.9	336	7	329	0.0	-	-	-	370	
CSB - 34.0 W	9-INCH Ø STORM SEWER-MAIN ST.	JULY 19/67	NO FLOW NOTED									
CSB - 34.0 W-2	12-INCH Ø STORM SEWER-MAIN STREET.	JULY 19/67	NO FLOW NOTED									
CSBTB - 34.0	BLACK CREEK TRIBU- TARY "B" DOWNSTREAM FROM MAIN STREET.	JULY 19/67	1.0	558	11	547	0.0	-	-	-	440	
CSB - 34.0	BLACK CREEK UP- STREAM FROM INLET TO FAIRY LAKE.	JULY 19/67	1.1	822	9	813	0.0	-	-	-	440	

TABLE 1 (CONTD)

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS			ANIONIC DETERGENTS		CHLORIDE		M.F. COLIFORM	
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)	AB	ABS	AS	CL	COUNT 100	PER ML
CSB = 33.1 W=3	8-INCH Ø STORM SEWER=MAIN ST. S.W. SIDE OF BRIDGE.	JULY 19/67	0.4	624	6	618	SAMPLE EXHAUSTED				2,040	
CSB = 33.1 W=2	10-INCH Ø STORM SEWER=MAIN ST. N.E. SIDE OF BRIDGE.	JULY 19/67	NO FLOW NOTED									
CSB = 33.1 W	18-INCH Ø STORM SEWER=MAIN ST. N.E. SIDE OF BRIDGE.	JULY 19/67	NO FLOW NOTED									
CSB = 33.1	BLACK CREEK AT MAIN ST. SOUTH END OF ACTON.	JULY 20/67	1.2	292	3	289	0.0		19		250	
CSB = 33.0 R	8-INCH Ø RELIEF SEWER=AGNES ST. SEWAGE PUMPING STATION.	JULY 19/67	NO FLOW NOTED									
CSB = 33.0 R=2	8-INCH Ø RELIEF SEWER=AGNES ST. SEWAGE PUMPING STATION.	JULY 19/67	NO FLOW NOTED									
CSB = 33.0 W	15-INCH Ø STORM SEWER=WILLOW ST.	JULY 20/67	NO FLOW NOTED									
CSB = 32.3	BLACK CREEK JUST UPSTREAM FROM ACTON WPCP OUTFALL.	JULY 20/67	1.0	468	10	458			69		660	

TABLE 1 (CONT'D)

SAMPLING POINT NO	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS			ANIONIC DETERGENTS AS ABS	CHLORIDE AS CL	M.F. COLIFORM	
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)			COUNT PER 100 ML	PER ML
CSB - 33.3 W	8-INCH Ø STORM SEWER-MILL ST. & VICTORIA AVE.	JULY 19/67	NO FLOW NOTED							
CSB - 33.2	BLACK CREEK AT MILL STREET.	JULY 19/67	1.1	360	6	354	0.0	-		110
CSB - 33.2 W-3	12-INCH Ø STORM SEWER-MILL ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.2 W-2	10-INCH Ø STORM SEWER-MILL ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.2 W	8-INCH Ø STORM SEWER-CHURCH ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.12	BLACK CREEK AT BROCK STREET.	JULY 19/67 JULY 20/67	3.0 1.1	324 292	20 5	304 287	0.0 0.0	- 19		65,000 (ANALYZED ON 20/7/67) 840
CSB - 33.1 W-7	12-INCH STORM SEWER-BROCK ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.1 W-6	8-INCH Ø STORM SEWER-BROCK ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.1 W-5	8-INCH Ø STORM SEWER-BROCK ST.	JULY 19/67	NO FLOW NOTED							
CSB - 33.1 W-4	12-INCH Ø STORM SEWER-MAIN ST. N.W. SIDE OF BRIDGE.	JULY 19/67	NO FLOW NOTED							

TABLE 1 (CONT'D)

[illegible]

TOWN OF ACTON

WATER QUALITY MONITORING PROGRAMME - BLACK CREEK SAMPLING

TABLE II

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY	SOLIDS		TURBIDITY UNITS	CHLORIDE		M.F. COLIFORM	
			BOD (PPM)	TOTAL (PPM)	SUSP. DISS. (PPM) (PPM)		AS	CL	COUNT 100	PER ML
CSB - 31,6	BLACK CREEK AT THIRD LINE DOWN- STREAM FROM ACTON WPCP.	JAN. 9/67	1.4	700	1	6.0	152			4
		JAN. 23/67	16	774	195	53	90			460,000
		FEB. 1/67	154	1246	63	27	408			430,000
		FEB. 27/67	**	798	48	32	175			1,600,000
		MAR. 22/67	4.9	938	8	9.5	259			330
		APR. 17/67	6.8	540	6	5.0	127			13,000
		MAY 10/67	13	532	25	20	105			9,000
		MAY 23/67	9.7	602	9	9.5	149			63,000
		JUNE 13/67	4.9	526	12	9.5	74			1,070
		JUNE 27/67	6.4	452	7	6.5	95			1,400
		JULY 31/67	5.5	920	11	6.5	241			5,400
		AUG. 15/67	8.8	760	1	4.5	193			1,300
		AUG. 29/67	3.3	652	3	4.0	167			3,400

